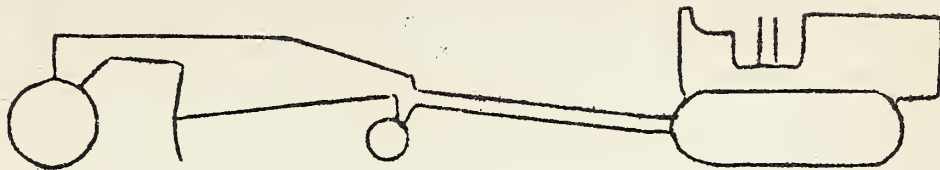


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CONSTRUCTION



HINTS

UNITED STATES DEPARTMENT OF AGRICULTURE, FOREST SERVICE

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No. 5

SIMPLE DEVICE FOR CHECKING GOVERNORS

Submitted by O. Wiederhold, Engineer, Washington, D. C.

It quite often becomes necessary in the field to check the setting of engine governors, particularly as applied to trucks.

A simple device that can be readily constructed by most camp shops is illustrated on page 2A.

As illustrated, a number of reeds made up of shim steel are clamped between the faces of two "V" blocks. Each reed is tuned so that its fundamental frequency (explained below) is equal to the vibration set up by the engine at a road speed corresponding to 35 M.P.H. This will of course vary between different makes of trucks and one reed should be tuned for each particular truck. In setting the reeds a truck should be obtained which has had its governor set to 35 M.P.H. A reed should then be tuned to this engine speed and tightly clamped between the blocks.

It should be noted that the reed will vibrate at a maximum when set to do so at its fundamental frequency. It will also vibrate at twice the fundamental and one-half the fundamental (called harmonics) but at an amplitude much less than the fundamental. The fundamental frequency can readily be obtained by a little experimenting. The device illustrated was constructed for four cylinder engines and longer and possibly thinner reeds will be necessary for six cylinder well balanced engines.

The EDITOR wishes to call to your attention that all contributions to CONSTRUCTION HINTS must come through the Regional Forester. These instructions were given in the first issue--Vol. 1 No. 1 of May 4, 1935. Please cooperate.

(Over)

USE OF DYNAMITE IN DRIVING PILES

Submitted by Region 8, Atlanta, Georgia.

Inspector J. A. Stone of the Division of States Relations found one of the North Carolina camps had experimented in using dynamite in driving piles, and raised the question as to the bearing capacity of a pile when driven by this method. Experiments were conducted on the Appalachian Unit, driving piles with dynamite as compared to piles driven with a gravity hammer, and it was found, after trying different kinds of explosives, that one pound of 40% ammonia dynamite gave the best results, and that the driving force for such a charge, which replaces the term "Wh" in the equation for determining bearing value, was twenty seven thousand (27,000) foot pounds, or the equivalent of a two thousand (2,000) pound hammer for a drop of $13\frac{1}{2}$ ft. The equation for safe load on the pile $\frac{(2wh)}{(S+1)}$ then becomes $\frac{54,000}{S+1}$, where S equals the average, in inches, of the last five blows.

The pile is set in place and held in vertical position by guy wires, a rolled steel plate 1-1/2" thick and 12" square or round is placed on top of the pile, and a charge of dynamite is placed on the plate and mudcapped.

It has been found that best results are secured by first digging a hole, approximately 18" deep, with a post hole digger, and placing a stick of dynamite in this hole, then filling the hole back and placing the pile directly over the hole. The plate and mudcapped charge are placed on top of the pile, and the charge under and on top of the pile exploded simultaneously. This gives an initial penetration of the pile of approximately 3 ft. After this the pile is adjusted to vertical position and the dirt tamped around it to hold it, and further guying is not necessary.

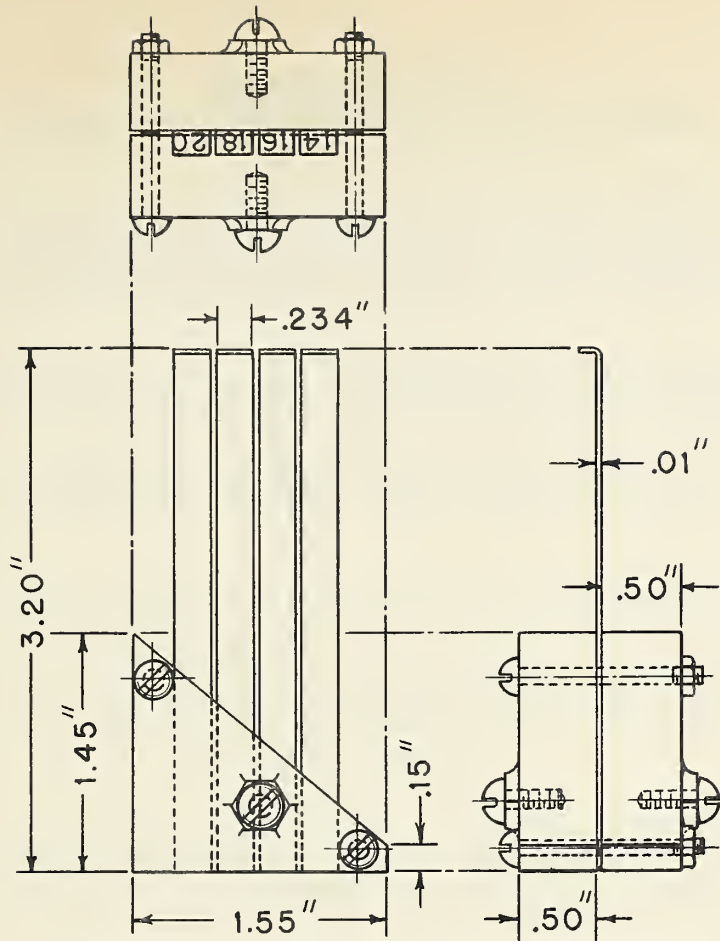
No method has been found for holding the plate on the pile, but the plate bounces off when the charge is exploded. It is important that the top of the pile be cut off perpendicular to the axis in order that the plate will rest horizontally and prevent a sidekick. A long wire is attached to the plate for retrieving it after the charge is exploded, if working in swampy areas where the plate is apt to be buried out of sight.

Another method would be to jet the pile down and give it a final kick or more by dynamite until the proper bearing value is secured.

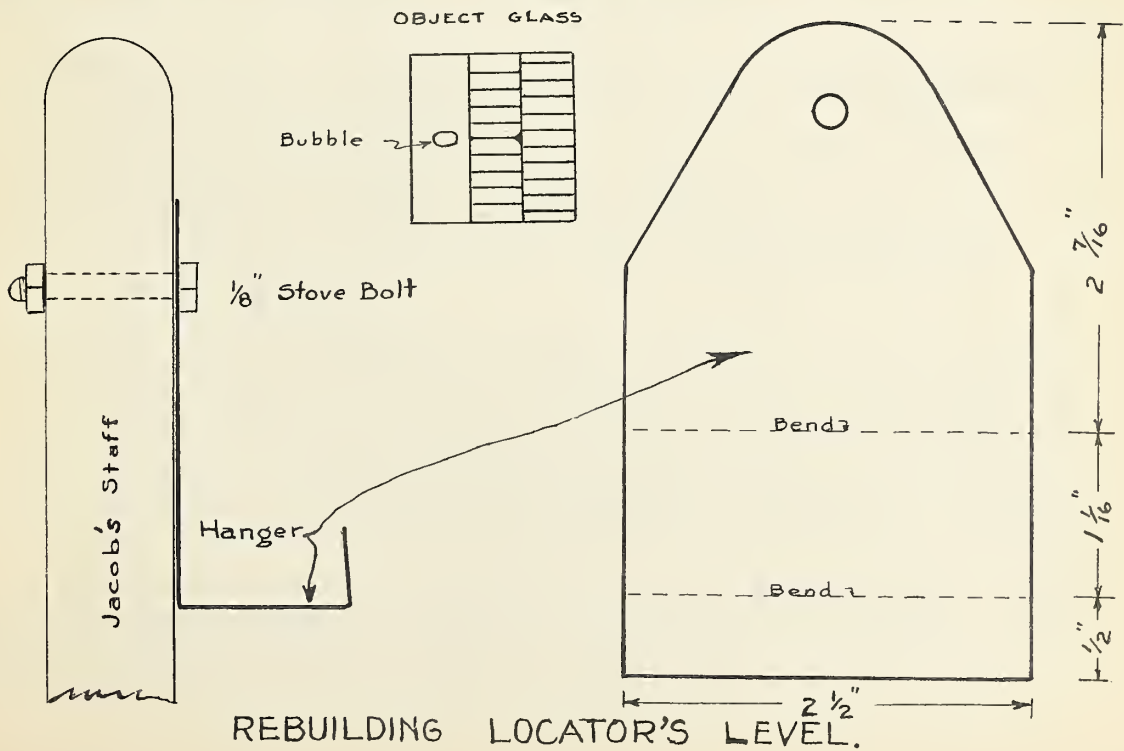
The use of dynamite in driving piles is not recommended as economical in comparison with the hammer method, but is found to be economical for small isolated jobs where it would be uneconomical to move a pile driver to the site.

EDITOR'S NOTE:

The above method should only be used with an experienced powder man to place and set off the charges. Extra precautions for safety should be used. Comments from the readers of "Construction Hints" will be appreciated. What do you think of the method?



CHECKING DEVICE FOR GOVERNORS.



REBUILDING LOCATOR'S LEVEL.

CLUTCH ADJUSTMENTS

Submitted by the Cleveland Tractor Company.

A few unofficial reports of Model 55 clutches slipping when the linings are not fully worn out indicate that operators are not taking advantage of the second adjustment. See particularly paragraph (e) below.

Lubrication - Every 4 to 5 working hours, give grease cup three complete turns. When empty, fill with correct grade of lubricant.

Every 50 working hours, remove drain plug in bottom of clutch compartment and clean hole in plug. Make sure no oil has accumulated in compartment.

Keep clutch pedal and all linkage well lubricated to insure freedom of operation. Use engine oil in cup on lower end of pedal.

Every 250 working hours and whenever clutch compartment cover is removed, put a few drops of oil on clutch release shaft bushings, clutch release sleeve, and clutch release linkage.

Clutch Adjustment - Form habit of checking free pedal travel, at beginning of each day's operation. (Free pedal travel is distance pedal pad travels forward from its extreme rear position, when lower end of pedal is against stop, to point where throw-out bearing touches retractor collar).

Clutch pedal originally has 1-3/4 inches free pedal travel. As friction facings wear, this distance gradually reduces. When travel is reduced to 3/4 inch, readjust in following manner:

- (a) Remove clutch compartment cover plate.
- (b) Loosen, but do not remove, the three clutch adjusting screws in clutch cover assembly.
- (c) Release clutch pressure by pushing pedal forward as far as possible and blocking it in this position.
- (d) Tap loosened screw heads carefully in clockwise direction until distance between clutch brake facing and throw-out bearing cup measures 5/8 inch after adjusting screws have been retightened.
- (e) After all the adjustment has been made so that the set screws have reached the extreme right end of the slot in the clutch cover, remove one screw at a time and, at the extreme left of the slot, you will find another hole threaded to take these screws, so that further adjustment may be had. These two adjustments will take care of normal wear, however, it is best to inspect this clutch each season for clutch lining renewal.

Sticking clutch - When the tractor has remained idle for a considerable length of time, a sticking clutch may be encountered. This can be overcome by removing one of the clutch adjusting screws and thoroughly flushing the clutch with kerosene.

LOCATOR'S LEVEL AS SUBSTITUTE FOR ABNEY

Submitted by H. D. Rives and J. W. Johnson - CCC Camp S-52,
New Jersey

The five inch "Locator's Level", a common piece of equipment in most CCC Camps, can be made into a very satisfactory substitute for the Abney in general levelling and profile work. In South Jersey, where prevailing grades are in general less than five percent, the Locator's Level has proven more satisfactory, more rapid, and as accurate as the Abney for profile work.

To alter the Locator's Level for this work, remove the "object glass" from the level and substitute in its place a piece of celluloid, on which lines have been etched as shown in the diagram.

The vertical line is of considerable use in setting "lines". The horizontal lines are spaced two percent of the length of the level in inches. The two percent lines on the left are measured up or down from the center of the object glass. Those on the right of the vertical line are set one percent, three percent, five percent, etc., above and below the center.

In use the level can be held as a hand level, or can be set on a "Jacob's Staff", or can be used in conjunction with the four inch compass by setting the level on top of the sights.

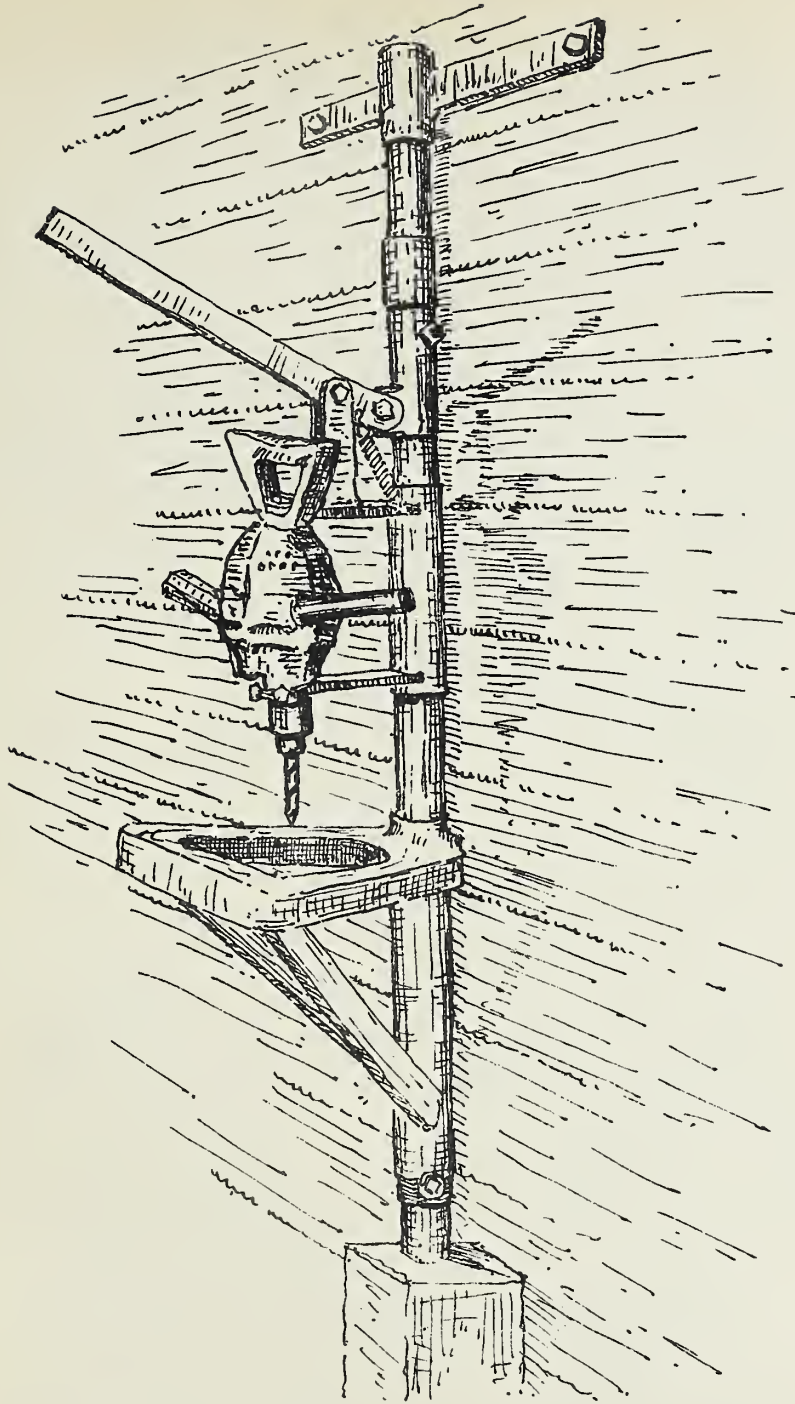
Graduation of lines on celluloid can be done by first pricking two points on each line with a needle, using a metal straight edge and cutting the line partly through the celluloid with a very sharp knife. The lines can then be filled with india ink.

The length of sight possible with this instrument is limited, as in all non-telescopic sights, by the size and marking of the object or target sighted on, and by the accuracy required in the work. Possible use of the level for rough stadia work is obvious.

The level must be carefully adjusted after the new glass is installed, to compensate for any inaccuracy in setting the center line on the "glass" and in centering the new "glass" in the level.

Region 4 - SAFETY ITEM - NIGHT DELIVERY OF GAS INADVISABLE

In a recent letter to the Regional Office, the Fishlake Forest states that instructions have been issued to Camp Superintendents to not permit the delivery of gas at night because of the danger of starting a fire or explosion when artificial light is used. They are insisting on the gas companies from whom gas or oil is purchased to make delivery only during the day time so there will be no need of using any kind of artificial light. This idea might be carried to other Forests.



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